Remarks:

Claims 39, 76 and 87 have been amended; claims 40 and 77 have been cancelled and new claims 96-98 have been added. Claims 1-38 and 47-55 were previously cancelled. Accordingly, claims 39, 41-46, 56-76 and 78-98 are currently pending for consideration.

I. Amendments:

Amended claims 39, 76, and 87 now recite that the amino resin and hardener components are in the form of strands. Recitation of applying the components by spraying has been deleted. No new matter has been added.

New claim 96 is directed to a method of separate application of resin and hardener components of an amino resin gluing system onto a substrate, wherein the hardener includes a volatile acid in an amount of 10-30% by weight and a thickener and is either free from filler or includes filler in an amount of less than 20% by weight, wherein the resin component is applied directly onto said substrate in the form of strands and the hardener component is applied on top of the resin component in the form of strands, in a manner which protects the substrate from direct contact with the volatile acid at time of application of the hardener component. Support for this claim can be found throughout the specification and specifically in previously presented claims 39 and 46 and in the specification at page 4, line 34 to page 5, line 18. No new matter has been added.

New claim 97 depends from claim 96 and recites that the ratio of hardener to resin is in the range of 1:3.5 to 1:2. Support can be found in the specification at page 4, lines 5-9. Again, no new matter has been added.

New claim 98 is directed to a method of producing a gluelam or laminated timer including a plurality of substrate layers glued together with an amino resin gluing system, the

method including the steps of: (a) feeding an amino resin component to at least a first orifice; (b) feeding a hardener component, which includes a volatile acid and is either free from filler or includes filler in an amount of less than 20% by weight, to at least a second orifice; (c) forming the gluing system by discharging the resin and hardener components through the respective first and second orifices in the form of strands onto at least a first surface of a first substrate layer, the discharged components remaining physically isolated from each other until at least one of the components contacts the at least first surface; (d) forming a joint with a second surface of a second substrate layer, with the gluing system disposed between the first and second substrate layers; and (e) producing the gluelam or laminated timer. Support for this claim can be found throughout the specification and specifically in previously presented claim 39 and in the specification at page 1, lines 8-9, and page 2, lines 1-5. No new matter has been added.

II. The Invention:

The presently claimed invention relates to a method of applying an amino resin gluing system to a substrate. As claimed in claim 39, the method includes the steps of feeding an amino resin component to at least a first orifice, feeding a hardener component to at least a second orifice, and discharging the resin and hardener through their respective orifices in the form of strands onto the substrate. The discharged components remain physically isolated from each other until at least one of the components contacts the substrate. The hardener is a volatile acid and is either free from filler or includes filler in an amount of less than 20% by weight. Applicants have found that when the amount of filler in the amino resin adhesive is kept below 20%, as claimed, delamination is greatly reduced. This result was quite unexpected, and is neither taught nor suggested by the prior art. Example 1 of the specification demonstrates and quantifies this unexpected result.

III. Rejections:

The following is a summary of the standing rejections made in the pending final Office Action:

1. Claims 39, 41-45, 56-59, 70-76, 78-82, 84-87, and 89-93 and 95 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert.

2. Claims 46, 83 and 88 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert, and further in view of Perciwall.

3. Claims 40 and 77 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert, and further in view of Menger.

4. Claims 60-64 and 66-69 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert and Toshio.

5. Claim 65 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert and Toshio, and further in view of Perciwall.

6. Claim 95 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert and Perciwall.

7. Claim 94 unpatentable under 35 U.S.C. §112, first and second paragraphs.

8. Claims 56, 57 and 58 unpatentable under 35 U.S.C. §103 based on Andersson in view of Lehnert. These claims are to be considered separately from the rejection of claims 39, 41-45, 59, 70-76, 78-82, 84-87, 89-93 and 95

These rejections will be addressed in the order listed above.

A. Rejection of claims 39, 41-45, 56-59, 70-76, 78-82, 84-87, and 89-93 and 95 under 35 U.S.C. §103 based on Andersson, in view of Lehnert

In the Office Action mailed January 14, 2005, page 7, the primary reference of Andersson is cited for teaching:
a method of applying a two-component gluing system to a substrate in which the resin component and the hardener component are separately applied to the substrate in the form of separate, parallel strands [abstract]. The components are applied through a nozzle (i.e., orifice) [p.6, ll. 9-17]. The two components do not contact each other until the substrate surfaces are joined together [p. 6, ll. 15-17]....Although Andersson teaches application of the components from a nozzle, the reference does not specify whether it is the same nozzle or two separate, discrete nozzles. Both Perciwall and Andersson teach that pre-curing is undesirable because it necessitates frequent cleaning of the application apparatus [Perciwall: p. 1, ll. 9-21 and Anderson: p. 1]. Based on these teachings, it would have been obvious to one of ordinary skill in the art to apply each component from its own, individual, dedicated nozzle, so as to avoid fouling of the nozzle that would require cleaning....

[Andersson] does not teach that the gluing system is an amino resin gluing system or feeding the amino resin and hardener components to at least first and second orifices, respectively.

The Office Action goes on to say on page 11, as a justification for combining Andersson with Lehnert:

The gluing system of Andersson is a formaldehyde-based adhesive, preferably resorcinol-formaldehyde or resorcinol-phenol formaldehyde [p. 2, ll. 5-11]. Lehnert teaches the equivalence of phenol and amino resins as conventional two-component adhesives in the art of joining wooden surfaces to form laminates, including condensation products of formaldehyde and urea and/or melamine [p. 1, ll. 28-31 and p. 3, l. 37-p. 4, l. 9].

Applicants respectfully submit that this basis for combining Andersson and Lehnert (discussed above) can only be made with improper use of hindsight. This is discussed more fully below.

The Teaching of the Andersson Reference

Andersson relates to a method of gluing a laminate using curable adhesives whereby resin and hardener are applied separately to the joint area (e.g., laminate surface), preferably in the form of separate parallel strands. See, Abstract. The object of the Andersson invention is set forth on page 2, lines 5-11.

The object of the invention according to Andersson is to solve the problems of bleeding from glue joints, glued for example in the production of laminated wood conventionally used formaldehyde based adhesives, preferably resorcinol-formaldehyde adhesives or resorcinol-phenolformaldehyde adhesives, by using an adhesive wherein the resin component has a limited water dilutability.

Thus, the problem addressed by Andersson is unwanted bleeding of adhesive from the joint areas. This can occur, for example, if the laminate is used in an outdoor environment exposed to rain and the glue joints become wet. Andersson teaches the use of separate application of resin and hardener, while advantageous in many respects, has the disadvantage that the components may not be completely mixed. This is because mixing necessarily occurs only on the laminate surface after the separate adhesive components have been applied. If the components are not distributed evenly on the surface, then mixing is incomplete, resulting in unreacted liquid component within the glue joint. If the laminate becomes wet, the liquid resin will dissolve in the water and bleed out, causing discoloration (see Andersson at page 1, line 30 et seq.).

The Andersson reference notes that this problem can be solved by employing an adhesive resin with "low water dilutability." Such a resin would not bleed out when the laminate becomes wet because of lower water solubility. In discussing prior art attempts to lower water dilutability, Andersson mentions low pH at page 2, lines 16-20.

The water dilutability for the mentioned resin components can be lowered by lowering the pH of the resin to below 7.5 and suitability to a pH of 7. However, the resin will hereby get a low reactivity and this is less desirable in certain fields of use. In the very next paragraph, Andersson distinguishes its teaching from the prior art use of lowered pH.

According to Andersson, improved results are achieved if the resin condensation, by means of a suitable selection of catalyst and other reaction conditions, is carried out in such a manner that a high content of methylene bridges and few free methyol groups are obtained. This resin has a low water dilutability, a high pH value and also high reactivity.

The teaching of the Andersson reference can thus be summed up as follows:

1) Separate application of phenol resin and hardener can cause bleeding due to inadequate mixing.

2) The bleeding problem can be addressed by reducing water dilutability.

3) Water dilutability can be reduced by lowering the pH of the resin to below 7.5, but this is inadequate because reactivity is decreased.

4) Water dilutability can be reduced without lowering pH by suitable control of the reaction conditions of the phenol condensation reaction conditions.

The following conclusions can be drawn from the teaching of the Andersson reference.

1) Andersson is directed generally to the use of phenolic resins, and makes no mention of amino resins.

2) Andersson is directed specifically to particular condensation reaction conditions for phenolic resins in order to lower water dilutability.

3) Andersson specifically teaches away from the use of acidic conditions as a means for lowering water dilutability of phenolic resins.

The Teaching of the Lehnert Reference

Lehnert is directed to a method for producing wood products such as plywood, and is particularly directed to an improved cold pressing technique for pre-pressing a package of veneer. The proposed improvement is a reduction in formaldehyde emissions by lowering the ratio of formaldehyde to resin in the adhesive composition. Normally, a lower ratio cannot be used because it reduces cold tack, but in Lehnert, this is compensated for by the application of a secondary hardener along the edges of the veneer. The secondary hardener reacts quickly with the resin and holds the veneer together, eliminating the need for cold tack in the primary adhesive

composition. Lehnert mentions that both phenol and amino resins can be used in the manufacture of plywood. See page 1, lines 28-31. The teaching of using a secondary hardener is applicable to "conventional" formaldehyde based, curable adhesives, including both phenol and amino resin adhesives. See page 3, line 37 to page 4, line 7.

No rationale for substituting an amino resin in the composition of Andersson

The Office Action provides no rationale for substituting an amino resin for the phenolic resin in Andersson. The only basis offered for such a substitution is the bare assertion in Lehnert that the resins are equivalent. However, Applicants respectfully submit that conventional does not mean equivalent.

While Lehnert is being cited for establishing the "equivalence" of phenol and amino resins, nowhere in the Lehnert reference is such an equivalence set forth. Lehnert states merely that both phenol and amino resins are conventional. It is respectfully submitted that equating "conventional" with "equivalent" strains the ordinary meaning of these words. Conventional in the present context means (from worldwebonline.com, an internet dictionary):

1) Following accepted customs and proprieties...
6) In accord with or being a tradition or practice accepted from the past...

The term equivalent, from the same source, is defined as:

1) A person or thing equal to another in value or measure or force or effect or significance etc.....
2) Being essentially equal to something....

Thus, phenol and amino resins may be "conventional" resins used in adhesives, and their use may be "in accord with or being a tradition or practice accepted from the past." They are not, however, "equal...in value or measure or force or significance..." The Lehnert reference itself refutes such an equivalence by establishing that phenol and amino resin systems are fundamentally different despite their conventionality. On page 4, lines 21-28, Lehnert states:
When the adhesive is an amino resin the hardener can for example be an inorganic or organic acid...When the adhesive is a phenol resin the edges of the veneer layers can be coated with a basic compound.

If phenol and amino resins were "equivalent" or "essentially equal," they would not employ totally different chemistries, requiring hardeners with diametrically opposing properties, viz., acidic vs. basic. Thus, Lehnert teaches that amino and phenolic resin adhesive systems are different, not equivalent, and use different hardeners. Accordingly, Applicants submit that there is no teaching or suggestion in Lehnert that an amino resin could be substituted for the resorcinol or resorcinol-phenol resin in Andersson, or that a volatile acid hardener could also be substituted.

Substituting an amino resin for a phenolic resin would fatally undermine the teaching of Andersson

Quite apart from any teaching in Lehnert of equivalency, replacing the phenolic resin of Andersson with an amino resin would render the Andersson disclosure totally meaningless. As noted above, Andersson is directed to specific conditions for producing a condensation reaction of resorcinol-formaldehyde adhesives or resorcinol-phenolformaldehyde adhesives. The resulting adhesive has a pH well above neutral, and indeed maintaining a high pH is one of the goals of Andersson. By substituting an amino resin for the resorcinol-based resin in Andersson, the entire teaching of specific reaction conditions in the Andersson reference must be ignored, since they are specific to resorcinol and cannot be applied to amino resins. Moreover, as Lehnert states, amino resins have an acid hardener, and acid conditions are contradictory to the Andersson teaching.

The Federal Circuit and its predecessor have long held that if a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. See, In re Fritch, 23 U.S.P.Q. 2d 1780, 1783 n.12 (Fed. Cir. 1992); In re Ratti, 123 U.S.P.Q. 349, 352 (C.C.P.A. 1959).

Here, the modification of Andersson (proposed by the Office Action) clearly destroys the reference's intended function.

The Office Action contradicts its own rationale for equivalency

While the Office Action argues that two different types of resin, i.e., phenol and amino, are equivalent, it simultaneously maintains that resins of the same type are not equivalent to each other, since it requests Applicants to "provide some rationale for the position that amino resins other than that in Example 1 function in an equivalent manner." [See, Interview Summary Record of October 13, 2005]. Applicants respectfully submit that the Office Action is inconsistent where it is argued on the one hand that resins of different types (phenol and amino) are equivalent, and on the other hand argue that resins of the same type (amino) are not equivalent and require Applicants to prove otherwise.

If there is any equivalency in Lehnert, it is that the described method of applying a hardener to the edges of a laminate can be used in conjunction with various "conventional" resin systems. However, this "equivalency" holds only in conjunction with other necessary process conditions that are completely contradictory to both Andersson and the presently claimed invention.

For example, Andersson teaches that pre-curing is undesirable because it necessitates frequent cleaning of the application apparatus, and therefore, according to the Examiner, each component is added on its own (See, page 7 of January 14, 2005 Office Action, supra.) Yet Lehnert requires mixing of resin and hardener in the applied adhesive system (Page 4, lines 5-21).

Example 1 of appellants' specification demonstrates unexpected results

Even assuming, arguendo, that the combination of Andersson and Lehnert did establish a prima facie case of obviousness, such obviousness is rebutted by the showing of unexpected results in Example 1 of the specification. Neither Andersson nor Lehnert recognize the unexpected result of lower delamination when the amount of filler is below 20% in the adhesive. Andersson provides no teaching of the significance of filler levels on delamination rates.

Accordingly, based on the above, it is respectfully requested that the rejection of claims 39, 41-45, 56-59,70-76, 78-82, 84-87, 89-93 and 95 under 35 U.S.C. §103(a), as being obvious over Andersson, in view of Lehnert, be withdrawn.

B. Rejection of claims 46, 83 and 88 under 35 U.S.C. §103 based on Andersson, in view of Lehnert, and further in view of Perciwall

Perciwall is cited for teaching the equivalency of formic acid with various other acids. However, the above noted defects in the combination of Andersson and Lehnert are not overcome by the addition of Perciwall. Hence, even if it were established that formic acid is "equivalent" to other acids within the context of the claimed invention, claims 46, 83 and 88 are not obvious in view of these references. Accordingly, it is respectfully requested that the rejection of claims 46, 83 and 88, based on Andersson, Lehnert and Perciwall, be withdrawn.

C. Rejection of claims 40 and 77 under 35 U.S.C. §103 based on Andersson in view of Lehnert, and further in view of Menger

As with Perciwall, the addition of Menger fails to overcome the above notes defects in the combination of Andersson and Lehnert. Menger is cited for teaching separate application of resin and hardener. However, this is inconsistent with the teaching of Lehnert, which requires mixing. If references are inconsistent, they "teach away" from each other. Such teaching away leads a person of ordinary skill in a direction divergent from the path that was taken by the applicant. Tec Air, Inc. v. Denso Mfg. Mich. Inc., 52 U.S.P.Q.2d 1294, 1298 (Fed. Cir. 1999). Hence, it is respectfully submitted that claims 40 and 77 are patentable despite the addition of Menger. Accordingly, it is respectfully requested that the rejection of claims 40 and 77, based on Andersson, Lehnert and Menger, be withdrawn.

D. Rejection of claims 60-64 and 66-69 under 35 U.S.C. §103 based on Andersson, in view of Lehnert and Toshio

Toshio is cited for teaching the application of adhesive components in strands. Again, however, its combination with Andersson and Lehnert does not address the above noted defects in combining these two references. Furthermore, the inconsistency of Toshio's separate strand application of components with Lehnert's required mixing of components would teach away from combining these references. Hence, Applicants respectfully submit that claims 60-64 and 66-69 are patentable over this combination of references. Accordingly, it is respectfully requested that the rejection of claims 60-64 and 66-69, based on Andersson, Lehnert and Toshio, be withdrawn.

E. Rejection of claim 65 under 35 U.S.C. §103 based on Andersson in view of Lehnert and Toshio, and further in view of Perciwall

The above noted defects in the combination of Andersson and Lehnert are not overcome by the addition of Perciwall and Toshio. Moreover, Toshio's separate application of strands is inconsistent with Lehnert's teaching of mixing, as noted above. Hence, claim 65 is not rendered obvious by the combined teaching of these references. Accordingly, it is respectfully requested that the rejection of claim 65, based on Andersson, Lehnert and Toshio, be withdrawn.

F. Rejection of claim 95 under 35 U.S.C. §103 based on Andersson in view of Lehnert and Perciwall

Despite the addition of Perciwall, the above noted defects in the combination of Andersson and Lehnert are not overcome by the addition of Perciwall. Hence, claim 95 is not rendered obvious by the combined teaching. Accordingly, it is respectfully requested that the rejection of claim 95, based on Andersson, Lehnert and Perciwall, be withdrawn.

G. Rejection of claim 94 under 35 U.S.C. §112, first and second paragraphs

Claim 94 is rejected as being indefinite. The Office Action contends that there is no support in the application as filed for applying the hardener on top of the resin. Support can be found in the following passages from page 2 of the PCT application, beginning at line 21, which states:
In the method, the resin component is preferably applied first in the form of strands, whereupon the hardener is applied in the form of strands.....the later applied strands may overlap, do not overlap, or do not contact, respectively, the previously applied strands of the other components.

This passage clearly teaches that the hardener can be applied on top of the resin, as the strands can overlap. Hence, Applicant respectfully submits that the rejection under §112 should be withdrawn.

H. Rejection of claims 56, 57 and 58 under 35 U.S.C. §103 based on Andersson, in view of Lehnert

Claim 56 recites that the hardener is free from filler. Claim 57 recites that the hardener comprises a filler in an amount of less than 15% by weight, and claim 58 recites filler in an amount of less than 10% by weight. Laminated structures containing these amounts of filler all show unexpectedly low delamination rates, as summarized in Example 1 of appellants' specification (page 6, line 26 et seq. of the PCT application). In that example, kaolin, a commonly used filler, was added to a hardener in amounts of 5, 15 and 30% by weight. Another laminated beam was constructed using hardener having no filler. As can be seen from the Table accompanying Example 1, when no filler was added, there was no delamination. Even when 15% filler is added, the level of delamination was at an acceptable rate of

6.1%. However, at 30% filler addition, delamination rate was very high at a rate of 24%. This rate is unacceptable, and demonstrates a heretofore unknown phenomenon, namely, that high amounts of filler in amino resin gluing systems can have an adverse effect on delamination rate. Hence even if a prima facie case of obviousness were established with respect to claims 56-58, the showing of unexpected results in appellants' specification would overcome it, and claims 56-58 are patentable.

Applicant is unaware of any teaching or suggestion by Andersson that the level of filler is of any significance in delamination rate, regardless of the adhesive system used. Accordingly, Applicant submits that the referenced claims are patentable based on the unexpected results in using different filler levels, discussed above.

For the above reasons, it is respectfully requested that the rejections be withdrawn.

Conclusion:

In light of the foregoing, Applicants respectfully submit that the application as amended is now in proper form for allowance, which action is earnestly solicited. If the Examiner has any questions relating to this Amendment or to this application in general, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,

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